Cisco Catalyst 4000 Series Gigabit Ethernet Modules

Overview

The Cisco Catalyst® 4000 series of modular, high-density, cost-effective switches extends the network services of a Catalyst switch-based backbone to the enterprise wiring closet with a rich variety of 1000-Mbps Gigabit and Gigabit server switching solutions. These switches include both fiber and copper interfaces that are easily extended to the desktop. Gigabit Ethernet switching modules include cost-effective, high-performance 1000BaseX Gigabit Interface Converter (GBIC)-based Gigabit Ethernet line cards and the highest density 48-port 10/100/1000BaseT multispeed auto-sensing, auto-negotiating Gigabit Ethernet line card and system in the industry.

Product Description

Gigabit-over-Copper Modules

The Cisco Catalyst® 4000 Series offers a rich variety of gigabit-over-copper solutions for wiring closets and server farms, enabling high-density gigabit connectivity to the desktop and servers over Category 5 copper cabling. The three line card options for the Catalyst® 4000 Series, shown below, include the 48-port 10/100/1000BaseT (WS-X4448-GB-RJ45), the 24-port 10/100/1000BaseT (WS-X4424-GB-RJ45), and the 14-port 1000BaseT (WS-X4412-2GB-T) module.

Figure 1 48-Port Line Card (WS-X4448-GB-RJ45)

Figure 2 24-Port Line Card (WS-X4424-GB-RJ45)

Figure 3 14-Port Line Card (WS-X4412-2GB-T)

48-Port 10/100/1000BaseT Line Card (WS-X4448-GB-RJ45)

The Cisco Catalyst 4000 Series 48-port 10/100/1000BaseT line card extends Cisco's leadership in the modular switched Ethernet market, providing the industry's highest density auto-negotiating Gigabit Ethernet from the network edge directly to desktop computers. This line card provides 48 RJ-45 ports

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with multispeed auto-sensing and auto-negotiating technology, enabling all ports to be used at 10 Mbps, 100 Mbps, or 1000 Mbps up to 100 meters over Category 5 copper cabling for optimum flexibility and investment protection. This module provides wiring closet investment protection by allowing Fast Ethernet desktops today to migrate to Gigabit Ethernet in the future without replacing the switch line cards. The 48 ports can burst to Gigabit Ethernet line rate and share 6 Gbps of full-duplex bandwidth into the switching fabric. The amount of oversubscription can be controlled by varying the number of ports used at 1000 Mbps. All ports can utilize Gigabit EtherChannel for high-speed interconnection applications. All ports use the standard IEEE 802.1x flow control (PAUSE frame) mechanism to control Gigabit Ethernet host traffic.

24-Port 10/100/1000BaseT Line Card (WS-X4424-GB-RJ45)

The Cisco Catalyst 4000 Series 24-port 10/100/1000BaseT line card provides 24 RJ-45 ports with multispeed auto-sensing and auto-negotiating technology, enabling all ports to be used at 10 Mbps, 100 Mbps, or 1000 Mbps up to 100 meters over Category 5 copper cabling. This module provides wiring closet investment protection by allowing Fast Ethernet desktops today to migrate to Gigabit Ethernet in the future without replacing the switch line cards. The 24 ports can burst to Gigabit Ethernet line rate and share 6 Gbps of full-duplex bandwidth into the switching fabric. The amount of oversubscription can be controlled by varying the number of ports used at 1000 Mbps. All ports can utilize Gigabit EtherChannel for high-speed interconnection applications. All ports use the standard IEEE 802.1x flow control (PAUSE frame) mechanism to control Gigabit Ethernet host traffic.

14-Port 1000BaseT Line Card (WS-X4412-2GB-T)

The Cisco Catalyst 4000 Series 14-port 1000BaseT line card provides two ports of dedicated 1000BaseX GBIC-based Gigabit Ethernet uplinks, as well as up to 12 RJ-45 ports for high-performance 1000BaseT Gigabit Ethernet server connectivity. The 12 server ports can burst to Gigabit Ethernet line rate and share 6 Gbps of full-duplex bandwidth into the switching fabric. All ports can utilize Gigabit EtherChannel for high-speed interconnection applications. The server ports use the standard IEEE 802.1x flow control (PAUSE frame) mechanism to control Gigabit Ethernet host traffic.

Gigabit-over-Fiber GBIC-Enabled Modules

The Cisco Catalyst 4000 Series offers a rich variety of GBIC-enabled gigabit-over-fiber solutions for high-performance Gigabit Ethernet uplinks and server farm connectivity. The two GBIC-enabled gigabit line card options for the Catalyst 4000 Series, shown below, include the 6-port 1000BaseX (WS-X4306-GB), and the 18-port 1000BaseX (WS-X4418-GB) module.

Figure 4 6-Port Line Card

Figure 5 18-Port Line Card

Six-Port GBIC-Enabled Gigabit Ethernet Line Card (WS-X4306-GB)

The Catalyst 4000 Series six-port Gigabit Ethernet line card provides six ports of dedicated 1000BaseX Gigabit Ethernet uplinks for high-speed backbone, switch-to-switch applications or small server-farm applications. It uses the versatile GBIC technology so intrabuilding multimode connections can be intermixed with long-distance, campus, single-mode connections. All ports can utilize Gigabit EtherChannel for high-speed interconnection applications.

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18-Port GBIC-Enabled Gigabit Ethernet Line Card (WS-X4418-GB)

The Cisco Catalyst 4000 Series 18-port Gigabit Ethernet line card provides two ports of dedicated 1000BaseX GBIC-based Gigabit Ethernet uplinks, as well as up to 16 GBIC-based ports for high-performance Gigabit Ethernet server connectivity. The 16 server ports can burst to Gigabit Ethernet line rate and share 8 Gbps of full-duplex bandwidth into the switching fabric. Because all ports use GBICs, the amount of oversubscription can be controlled by varying the number of GBICs used. All ports can utilize Gigabit EtherChannel for high-speed interconnection applications. The server ports use the standard IEEE 802.1x flow control (PAUSE frame) mechanism to control Gigabit Ethernet host traffic.

Key Benefits

High Performance and Cost-Effective Gigabit Ethernet Connectivity

Delivering advanced switching solutions that scale bandwidth as you add ports, the Cisco Catalyst 4000 Series solution is powered by leading-edge ASIC technology that offers wire-speed Layer 2 and Layer 3 gigabit switching solutions. Layer 2 switching is powered by a 24-Gbps, 18-Mpps engine and Layer 3 switching is powered by a scalable 8-Gbps, 6-Mpps engine. Supporting a very low latency, centralized, shared-memory switching fabric architecture, the Cisco Catalyst 4000 Series enables high performance, Gigabit Ethernet server connectivity and Gigabit Ethernet to the desktop. By blending advanced engineering and advances in manufacturing, the Cisco Catalyst 4000 Series delivers powerful Gigabit Ethernet switching solutions at a very cost-effective price point.

Functionally Transparent Gigabit Ethernet Line Cards

The Cisco Catalyst 4000 Series architecture enables customers to easily upgrade all Gigabit Ethernet line cards on their Catalyst 4000 systems to higher-layer switching functionality by simply adding new fabric engine modules such as a new Layer 3 services module. This enables customers to easily upgrade their networks to deploy new higher-layer functionality on their Gigabit Ethernet switching solutions without replacing existing Gigabit Ethernet line cards.

Scalable and Reliable Gigabit Ethernet Solutions

The modular chassis flexibility, variety of Gigabit Ethernet modules, and hardware and software redundancy features ensure that the Cisco Catalyst 4000 Series meets customers' needs by delivering reliable, fault-tolerant, and scalable Gigabit switching solutions. Cisco Gigabit EtherChannel® technology, which is based on proven EtherChannel technology pioneered by Cisco and extensively deployed in networks worldwide, enables customers to deploy multigigabit links in server farms that scale up to 8 Gbps ports for each Gigabit EtherChannel. Port redundancy with UplinkFast and PortFast, Spanning Tree Algorithm enhancements, and link redundancy with Gigabit EtherChannel, across Gigabit links, ensures reliable and fault-tolerant operations of critical applications.

Gigabit Ethernet Solutions with Proven Cisco Catalyst Enterprise Software

The Cisco Catalyst 4000 Series Gigabit Ethernet solutions deliver consistent, high-end enterprise features by supporting the same software feature set as that of the industry-leading Cisco Catalyst 2900, 5000, and 6000 Series. With consistent software and user interfaces, customers can retain their knowledge base and continue to grow their networks with Cisco Catalyst 4000 Series Gigabit Ethernet solutions and interface seamlessly with other Catalyst 2900, 5000, and 6000 Series switches in the network.

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Features

- Support for 16,000 MAC addresses dynamically allocated between active ports
- Hardware-based support for 1024 virtual LANs (VLANs)
- 24-Gbps capacity and 18-Mpps Layer 2 performance
- Hot swap capability on all Gigabit Ethernet line cards
- Support for up to 240 ports of 10/100/1000 RJ-45 in one Catalyst 4000 chassis
- Gigabit Ethernet modules in the Cisco Catalyst 6500 Series are based on industry-standards IEEE 802.3z and IEEE 802.3ab, ensuring vendor interoperability and long-term investment protection
- All Gigabit Ethernet ports can be 1000BaseSX, 1000BaseLX/LH, or 1000BaseZX by using flexible, hot-swappable, GBIC modules
- GBIC-based Gigabit Ethernet modules enable data transmission up to 100 km, supporting fiber-optic SC interfaces for both multimode and single-mode connectivity
- Copper-based Gigabit Ethernet modules enable transmission at 10/100/1000 or 1000 Mbps speeds up to 100 meters over Category 5 cables
- Gigabit EtherChannel technology across all 1000 Mbps ports
- Dual queuing on all ports
- Functionally transparent Gigabit Ethernet line cards
- Long distance runs of Gigabit Ethernet over single-mode fiber

Cisco Catalyst 4000 Series Gigabit Ethernet Port-Density Configuration Ranges

The fully loaded Cisco Catalyst 4003 supports one Supervisor I and two switching modules. The Supervisor I, included with the chassis common equipment, is required in slot 1. The fully loaded Catalyst 4006 supports one Supervisor Engine II and five switching port modules. The Supervisor Engine II with dual Gigabit Ethernet uplink ports is included with the chassis common equipment and is required in slot 1. Table 1 lists the minimum and maximum number of Gigabit Ethernet ports, as well as the port-density alternatives and interface types for the Cisco Catalyst 4000 Series.

Table 1 Cisco Catalyst 4000 Series 1000BaseT Gigabit Ethernet Port-Density Configuration Options

		Min/Max Interfaces per Chassis	
Cisco Catalyst 4000 Series Switching Modules	Number of Interfaces Supported per Line Card (Type)	Catalyst 4003 with Supervisor I	Catalyst 4006 with Supervisor II
Number of Gigabit Ethernet Uplinks on Supervisor	N/A	0	2
WS-X4306-GB	6 (GBIC)	6/12	6/30
WS-X4418-GB	18 (GBIC)	18/36	18/90
WS-X4412-2GB-T	12 (RJ-45) + 2 (GBIC)	14/28	14/70
WS-X4424-GB-RJ45	24 (RJ-45)	24/48	24/120
WS-X4448-GB-RJ45	48 (RJ-45)	48/96	48/240

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Ordering Information

Table 2 Cisco Catalyst 4000 Gigabit Ethernet Module Part Numbers

Product Number	Description
WS-X4306-GB	Catalyst 4000 Gigabit Ethernet Module, 6 ports (GBIC)
WS-X4418-GB	Catalyst 4000 GE Module, Server Switching 18 ports (GBIC)
WS-X4412-2GB-T	GE Switch Module, 12 1000T(RJ-45) + 2 1000X(GBIC)
WS-X4424-GB-RJ45	Catalyst 4000 24-port 10/100/1000 Module (RJ-45)
WS-X4448-GB-RJ45	Catalyst 4000 48-port 10/100/1000 Module (RJ-45)
WS-G5484	1000BASE-SX 'Short-Wave' GBIC (multimode only)
WS-G5486	1000BASE-LX/LH long haul GBIC (single-mode or multimode)
WS-G5487	1000BASE-ZX extended reach GBIC (single-mode only)

Technical Specifications

Table 3 Gigabit Ethernet Link Distances

Fiber Core	62.5um Multimode	50um Multimode	9/10um Single Mode
Fiber Modal Bandwidth	160/500 MHz-km 200/500 MHz-km	400/400 MHz-km 500/500 MHz-km	N/A
1000BaseSX	220 m 275 m	500 m 550 m	N/A
1000BaseLX/LH	550 m 550 m	550 m 550 m	10 km
1000BaseZX	N/A	N/A	70 to 100 km

Standard Network Protocols

- Gigabit Ethernet: IEEE 802.3z, IEEE 802.3x, IEEE 802.3ab
- 1000BaseX (GBIC)
  - 1000BaseSX
  - 1000BaseLX/LH
  - 1000BaseZX

EtherChannel Technology

- Gigabit EtherChannel technology: All 1000-Mbps ports
- Port Aggregation Protocol (PagP): Yes
- Number of ports per tuple: 8
- EtherChannel technology across line cards: Yes

Gigabit Switching Line Card Modules

6-port Gigabit Ethernet Module

- 6 Gigabit Ethernet ports, GBIC slots
- Status: Green (operational)/red (faulty)
- Link: Green (operational)/red (faulty)

18-port Gigabit Ethernet Module

- 18 Gigabit Ethernet ports, GBIC slots
- Status: Green (operational)/red (faulty)
- Link: Green (operational)/red (faulty)

14-port 1000BaseT Gigabit Ethernet Module

- 12 Gigabit Ethernet ports, RJ-45 interface, plus two 1000 Gigabit Ethernet ports, GBIC slots
- Status: Green (operational)/red (faulty)
- Link: Green (operational)/red (faulty)
- Maximum Cable Discharge (withstand): 3.0 kV

24-port 10/100/1000BaseT Gigabit Ethernet Module

- 24 10/100/1000BaseT auto-sensing ports, RJ-45 interface
- Status: Green (operational)/red (faulty)
- Link: Green (operational)/red (faulty)

48-port 10/100/1000BaseT Gigabit Ethernet Module

- 48 10/100/1000BaseT auto-sensing ports, RJ-45 interface
- Status: Green (operational)/red (faulty)
- Link: Green (operational)/red (faulty)

Physical Specification

- Occupies one slot in the Cisco Catalyst 6000 Series platform
- Dimensions (H x W x D): 1.2 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm)

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Environmental Conditions

- Operating temperature: 32º to 104ºF (0º to 40ºC)
- Storage temperature: –40º to 167ºF (–40º to 75ºC)
- Relative humidity: 10 to 90%, noncondensing
- Operating altitude: –60 to 4000 m

Safety Conditions

- Fiber optic lasers: Class 1 laser products

Safety Certifications

- UL 1950
- EN 60950
- CSA-C22.2 no 950
- IEC 950

Electromagnetic Emissions Certifications

- FCC 15J Class A
- VCCI Class A
- CE Marking
- EN 55022 Class A
- EN 55024 Class A
- CISPR 22 Class A
- AS/NZ 3548
- NEBS Level 3 (GR-1089-CORE, GR-63-CORE)
- ETSI ETS-300386-2

Cisco Catalyst 4000 Series Hardware Technical Specifications

Please refer to the Cisco Catalyst 4000 Series data sheet at:

http://wwwin.cisco.com/cmc/cc/pd/si/casi/ca4000/prodlit/c4000_ds.htm

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